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Hidden sound laws in the inflectional morphology of Proto-Indo-European

A phonological account of the primary first singular of thematic verbs and the instrumental of thematic nouns and adjectives

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Most of C[owgill]'s observations are persuasive and quite acceptable, but his derivation of the marker for first person singular of the primary endings in the thematic paradigm is difficult to defend from the viewpoint of historical phonology.

Alfred Bammesberger in *Language* 85 (2009), p. 222

The paper deals with the widely known asymmetry in the inflection of the thematic present stems of PIE. While in the 2sg. and 3sg. active the desinences of the present indicative are constructed by simply adding an **-i* to the corresponding desinences of the injunctive mood, the relation between the present indicative and the corresponding injunctive form is markedly different in the 1sg. The unexpected 1sg. present indicative of the thematic present stems in PIE **-ō* or **-oH* has been the subject of many morphological hypotheses. This desinence is mostly interpreted as a remnant of a more ancient inflectional system which is assumed to have been entirely different from that of the athematic verbs. A more promising solution to the problem of the thematic 1sg. present indicative was proposed by Warren Cowgill. According to him, the unexpected shape of the 1sg. present indicative of the thematic present stems is a result of a purely phonological development of an older **-om-i* which is to be expected beside the corresponding injunctive desinence **-om*. Cowgill saw a further instance of the proposed sound change in the inflection of the thematic nouns where the instrumen-

tal plural ends in PIE **-ōis* instead of expected **-o-mis*. The paper deals with the most serious objections against Cowgill's account, showing that none of them in fact invalidates his plausible hypothesis.

1 Introduction

In the present paper I will show that solutions to morphological problems in reconstructed languages are often to be found not in the domain of morphology itself but rather in previous phonological developments. It seems that contemporary historical linguists all too often attempt to explain asymmetries in the inflectional morphology by postulating hypothetical restructuring of inflectional patterns, borrowing of inflectional material from one paradigm into another, secondary extension of inflection markers by parts of other inflection markers and so forth. I agree in particular with Rasmussen (1989: 484):

Die weitere Erklärung von schon rekonstruierten Sprachzuständen wird häufig so vorgenommen, als ob in der Vorzeit der Grundsprache keine Lautveränderungen, sondern ausschließlich morphologische Verschiebungen stattgefunden hätten.

We know from languages with a documented history that reasons for paradigmatic asymmetries are in many cases purely phonological. Cf. the inflection of *nehmen* 'to take', *treten* 'to step' and *wollen* 'to want' in the present indicative of Modern German:

1	1sg.	<i>nehm-e</i>		<i>tret-e</i>		<i>will-Ø</i>
	2sg.	<i>nimm-st</i>	~	<i>tritt-st</i>	~	<i>will-st</i>
	3sg.	<i>nimm-t</i>		<i>tritt-Ø</i>		<i>will-Ø</i>

It is clear that the inflection of *treten* is neither that of the large class of verbs inflecting like *nehmen* nor that of the less numerous but frequently used verbs inflecting like *wollen*. The reason for this situation is obviously not a morphological transition of *treten* from the *nehmen*-type, where it originally belonged, to the *wollen*-type but the simple phonetic assimilation of the 3sg. ending *-t* to the root-final dental stop. Thus, to achieve realistic reconstructions of inflectional patterns, we have to pay attention to phonological developments which might have operated in the inflectional forms we intend to explain.

The particular problem to be discussed in the present paper is the widely known asymmetry in the inflection of the thematic present stems of PIE. While in the 2sg. and 3sg. active the desinences of the present indicative are constructed by simply adding an **-i* to the corresponding desinences of the injunctive mood, the relation between the present indicative and the corresponding injunctive form is markedly different in the 1sg. This asymmetry is even more astonishing if one considers the inflection of the athematic present stems in which the 1sg. does not deviate from the rest of the paradigm. Cf. PIE athematic **p_lnéh₁-* 'to fill' (Skt *prṇā-ti*) vs. thematic **b^hér-e/o-* 'to carry' (Skt *bhára-ti*):

	athematic presents		thematic presents	
	injunctive	present indicative	injunctive	present indicative
1sg.	<i>*p_lnéh₁-m</i>	<i>*p_lnéh₁-mi</i>	<i>*b^hér-o-m</i>	<i>*b^hér-ō</i> or <i>*b^hér-oH</i>
2sg.	<i>*p_lnéh₁-s</i>	<i>*p_lnéh₁-si</i>	<i>*b^hér-e-s</i>	<i>*b^hér-e-si</i>
3sg.	<i>*p_lnéh₁-t</i>	<i>*p_lnéh₁-ti</i>	<i>*b^hér-e-t</i>	<i>*b^hér-e-ti</i>

The unexpected 1sg. present indicative of the thematic present stems in PIE **-ō* or **-oH* has been the subject of many morphological hypotheses. This desinence is mostly interpreted as a remnant of a more ancient inflectional system which is assumed to have been entirely different from that of the athematic verbs, see in the first place Jasanoff's (1994, 1998, 2003) beautifully elaborated theory according to which the thematic present stems were originally inflected as follows:

Early PIE			Late PIE		
1sg.	<i>*b^hér-h₂e</i>	1pl. <i>*b^hér-me</i>	1sg.	<i>*b^hér-o-h₂</i>	1pl. <i>*b^hér-o-mes</i>
2sg.	<i>*b^hér-th₂e</i>	2pl. <i>*b^hér-(t)e</i>	→ 2sg.	<i>*b^hér-e-si</i>	2pl. <i>*b^hér-e-tes</i>
3sg.	<i>*b^hér-e</i>	3pl. <i>*b^hér-ŕ(s)</i>	3sg.	<i>*b^hér-e-ti</i>	3pl. <i>*b^hér-o-nti</i>

However, hypotheses of this kind are particularly difficult to accept because of the quite unusual amount of morphological restructuring one necessarily has to assume. In Jasanoff's account, not a single form in the whole inflection of the thematic present stems in Late PIE is seen as going back directly to its Early PIE ancestor.

By contrast, Dunkel (2002) makes a different proposal to explain the thematic 1sg. present forms like PIE **b^hér-ō* or **b^hér-oH*. In his opinion, forms of this kind originally arose in the subjunctive paradigm of the athematic presents, such as **h₁éj-ō* of **h₁éj-* ~ **h₁i-* 'to go'. The desinence

*-ō is explained as being related to the *-ō found, for instance, in the 1sg. personal pronoun PIE *eǵH-ō 'I' (Gk *ἐγώ*, Lat *ego*). According to Dunkel, emphatic sentences of the type *eǵHō *h₁éimi* 'I will go!' secondarily developed into *eǵHō *h₁éiō* by perseveration, i.e. grammatical hypercharacterisation by unnecessary repetition of endings. After having arisen in this way, the voluntative 1sg. **h₁éiō* secondarily penetrated the inflectional paradigm of the athematic subjunctive providing a model for the creation of **b^hérō*-type inflections in the indicative of the thematic stems.

This explanation seems very problematic, as its crucial point, the perseveration, is generally believed to be an irregular process. In my opinion, the chances of uncovering the real prehistory of languages by postulating irregular morphological modifications of inflectional forms are not better than by assuming sporadic violations of established sound laws. We know from living languages that sound laws are occasionally violated for no obvious reason, or rather for reasons that we do not understand yet. However, we do not use the notion of such violations in our reconstructions because changes for unknown reasons are uncontrollable. Changes described as perseveration seem to occur from time to time in the documented history of languages, but nobody knows how perseveration actually works and under which conditions its operation is restricted to this limited number of instances. It seems difficult to make reliable reconstructions by using morphological processes that are underinvestigated to the degree of an apparent irregularity.

An entirely different and more promising solution to the problem of the thematic 1sg. present indicative was proposed by W. Cowgill (1985a: 108) in his influential paper on the thematic inflection of verbs in PIE:

Perhaps PIE 1st sg. *-ō is the regular outcome of the expected ***-omi*, existing at some time in pre-Indo-European. The system of thematic noun inflection offers an analogous situation in the instrumental plural, where instead of the *-*obhis/-omis* that we would expect on the analogy of all other stem classes (including *o*-stem pronouns with *-*oibhis/-oimis*), we find PIE *-*ōis*. Perhaps verbal *-ō for ***-omi* and nominal *-*ōis* for ***-obhis* or ***-omis* can be combined: an ***m* of pre-IE <...> before word-final *-i* or *-is* and preceded immediately by *o* would have assimilated to the preceding vowel, giving ***-ōi*, ***-ōis*, liable to contract to *-*ōi*, *-*ōis*. The latter,

we can say ad hoc, remained in PIE, but word-final *-*ōi* was simplified to *-*ō*.

Thus, according to Cowgill, the unexpected shape of the 1sg. present indicative of the thematic present stems is a result of a purely phonological development of an older *-*om-i* which is to be expected beside the corresponding injunctive desinence *-*om*. Cowgill saw a further instance of the proposed sound change in the inflection of the thematic nouns where the instrumental plural ends in PIE *-*ōis* instead of expected *-*o-mis* based on the evidence of Baltic and Slavic:

4	Lith		OCS		
	nom.sg.	instr.pl.	nom.sg.	inst.pl.	
<i>i</i> -stems	<i>žvēri-s</i>	<i>žvēri-mis</i>	<i>zvěři</i>	<i>zvěři-mi</i>	'animal'
<i>u</i> -stems	<i>sūnū-s</i>	<i>sūnu-mis</i>	<i>synū</i>	<i>synū-mi</i>	'son'
<i>o</i> -stems	<i>pīršta-s</i>	<i>pīrštai-s</i>	<i>pristū</i>	<i>pristy</i>	'finger'

We find a nice parallelism in the phonological development of the expected sound chain *-*omi(s)* in two entirely independent morphological positions:

5	1sg.pres.ind.	Early PIE *- <i>o-mi</i> > Late PIE *- <i>ōi</i>	Gk - <i>ω</i> , Lat - <i>ō</i> , OAv 1sg.subj. - <i>ā</i> , PCelt. *- <i>ū</i> (Gaul - <i>u</i> , OIr - <i>u</i>), PBalt *- <i>ō</i> (Lith, Latv - <i>u</i> , OPr - <i>a</i>), PGmc *- <i>ō</i> (Goth - <i>a</i> , OHG - <i>u</i>)
	instr.pl.	Early PIE *- <i>o-mis</i> > Late PIE *- <i>ōis</i>	Skt - <i>ais</i> , OAv - <i>āiš</i> , Lith - <i>ais</i> , OLatv - <i>es</i> , OCS - <i>y</i> , Lat - <i>īs</i>

The 1sg. present indicative, traditionally reconstructed as PIE *-*ō*, and in more recent times, after the development of the laryngeal theory, mostly as *-*oH*, is now assumed to be PIE *-*ōi*. This assumption surely strikes one as particularly unusual when one reads Cowgill's paper for the first time: we are so used to the plain long *ō* of Greek and Latin. Note, however, that we actually know the plain long vowel to be the regular outcome of PIE *-*ōi*# in Greek and Indo-Iranian. Cf. the inflection of the amphikinetic *i*-stems with nom.sg. in *-*ōi*#

6	Skt		OAv	PIE	
	nom.sg.	<i>sákhā</i>	<i>huš.haxā</i>	< * <i>sék^w-h₂ōi</i>	
	acc.sg.	<i>sákhāyam</i>	<i>huš.haxāim</i>	* <i>sék^w-h₂ōi-ṃ</i>	'follower'

	Gk	
nom.sg.	$\acute{\eta}\chi\acute{\omega}$	$*\acute{\eta}\acute{e}h_2g^h-h_2\acute{o}\acute{i}$ 'sound', 'voice'
acc.sg.	$\acute{\eta}\chi\acute{\omega}$	< $*\acute{\eta}\acute{e}h_2g^h-h_2\acute{o}\acute{i}-\eta$
voc.sg.	$\acute{\eta}\chi\acute{o}\acute{i}$	$*\acute{\eta}\acute{e}h_2g^h-h_2\acute{o}\acute{i}^1$

We know that other resonants can likewise disappear without a trace in word final position after long vowels in IE languages, cf. the nominative singular of the *m*. and *f*. *n*-stems and *r*-stems in PIIr $*-\tilde{a}$, PBalt $*-\tilde{o}$ and $*-\tilde{e}$. But these resonants are only lost in some of the daughter languages, being preserved or partly preserved in others, so for instance $-\omega v$, $-\eta v$ and $-\omega p$, $-\eta p$ in Greek or $-\tilde{o}$ but $-or$, $-er$ in Latin (with secondary shortening). In the case of the amphikinetic *i*-stems, the lack of $*\acute{i}$ in Indo-Iranian as well as in Greek strongly suggests that PIE $*-\tilde{o}\acute{i}\#$ indeed developed into $*-\tilde{o}\#$ already before the disintegration of the parent language.

However, Cowgill's solution to the problem of the 1sg. present indicative of the thematic verbs was widely ignored due to obvious difficulties which Cowgill unfortunately did not address in his paper. In the following I will discuss the most serious objections against Cowgill's account, showing that none of them in fact invalidates his plausible hypothesis. First, I will discuss the unusual syllabification presupposed by Cowgill's sound change for earlier stages of PIE. Then I will turn to Cowgill's use of the instrumental case of the thematic nouns. In the last section, I will talk about the possible additional evidence for the proposed sound change in the inflectional morphology of PIE.

2 Syllabification of resonants in Early and Late PIE

The first objection against Cowgill's hypothesis is the observation that the assumed change of Early PIE $*-omi(s) > \text{Late PIE } *-\tilde{o}\acute{i}(s)$ is incompatible with the syllabification rules of PIE. The $*i$ in PIE $*-omi(s)$ necessarily has to be vocalic and a vowel can hardly be assumed to assimilate the preced-

1 The dative singular of the *o*-stems in PIE $*-\tilde{o}\acute{i}$ (Gk $-\omega$, OAv $-\tilde{a}\acute{i}$, Lepontic $-\acute{u}i$) reflects older $*-o-e\acute{i}$, and thus does not contradict the assumed development. The contraction in the dative singular of the *o*-stems may be more recent than the loss of $*-i\#$ in the nominative singular of the amphikinetic *i*-stems.

ing resonant $*m$. In fact, only $*-omi(s)$ with a consonantal variant of $*i$ may be expected to develop into something like $*-oni(s) > *-\acute{o}\acute{i}\acute{i}(s)$ and then $*-\tilde{o}\acute{i}(s)$ by usual PIE simplification of geminates with compensatory lengthening.

However, this quite serious objection does not invalidate Cowgill's account because it can be demonstrated that the syllabification rules that are traditionally assumed for the latest stage of PIE did not operate in more ancient times. The clearest proof is constituted by the development of Early PIE $*um$ to Late PIE $*mm > *m$ known as Stang's law (cf. Stang 1965, Schindler 1973):

7 acc.sg. of PIE $*g^w\acute{o}u-$ f. 'cow', m. 'bullock' and $*d\acute{i}\acute{e}u-$ m. 'sky'

Early PIE	Late PIE		Skt	OAv	Hom. Gk
$*g^w\acute{o}u-m$	$*g^w\acute{o}m$	>	$g\acute{a}m$	$g\acute{a}m$	$\beta\acute{\omega}v$
$*d\acute{i}\acute{e}u-m$	$*d\acute{i}\acute{e}m$		$dy\acute{a}m$	-	$Z\eta\nu$

This sound change clearly violates the syllabification rules of Late PIE. The accusative singular marker $*-m$ should have been vocalic after the consonantal $*u$, but a vowel cannot be assumed to assimilate and then absorb a consonant.

Moreover, it can be shown that Stang's law must have operated at a stage of the language in which the syllabification as usually reconstructed for the latest period of PIE was entirely irrelevant. We just saw a development of Early PIE $*um$ to Late PIE $*mm > *m$ between a vowel and the word-boundary where $*u$ should have been consonantal and $*m$ vocalic. But there also exists the opposite situation with Early PIE $*um > \text{Late PIE } *mm > *m$ between a consonant and a vowel, where $*u$ should have been vocalic and $*m$ consonantal:

8 PIE $*k\acute{l}\acute{n}\acute{e}u- \sim *k\acute{l}\acute{n}u-$ 'to hear'

	Early PIE		Late PIE		Skt
3.sg.inj.m.	$*k\acute{l}\acute{n}u-t\acute{o}$		$*k\acute{l}\acute{n}u-t\acute{o}$		$\acute{s}r\acute{n}u-t\acute{a}$
3.sg.ind.m.	$*k\acute{l}\acute{n}u-t\acute{o}\acute{i}$		$*k\acute{l}\acute{n}u-t\acute{o}\acute{i}$		$\acute{s}r\acute{n}u-t\acute{e}$

but

1.pl.inj.act.	$*k\acute{l}\acute{n}u-m\acute{e}$	>	$*k\acute{l}\acute{n}-m\acute{e}$	>	$\acute{s}r\acute{n}-m\acute{a}$
1.pl.ind.act.	$*k\acute{l}\acute{n}u-m\acute{e}-s$	>	$*k\acute{l}\acute{n}-m\acute{e}-s$	>	$\acute{s}r\acute{n}-m\acute{a}s$

The development is exactly the same, the only difference being the lack of visible compensatory lengthening in the consonant preceding Early PIE **um*.

PIE morphology contains more instances of ancient syllabification that can not be accounted for in terms of Late PIE phonotaxis. A very clear instance of this is found in the feminine inflection of the PIE pronoun **sém-* ~ **sm-* 'one' (Gk nom. m. *εἷς*, n. *ἓν*, Toch B nom. m. *še*)² where – strangely enough – again **m* and **i* are involved (cf. most recently Gippert 2004 with ref.):

9	Early PIE	Late PIE	Hom. Gk
nom.sg.	<i>*smih₂</i>	<i>*smih₂</i>	<i>μία</i>
gen.sg.	<i>*smieh₂-es</i>	<i>*sieh₂-es</i>	<i>ιᾶς</i>
dat.sg.	<i>*smieh₂-ei</i>	<i>*sieh₂-ei</i>	<i>ιᾷ</i>

The feminine allomorph of the pronoun is clearly also the basis of Hitt *šia-* 'one' (gen. *šiel*, instr. *šiet*), cf. Goedegebuure (2006).

Case forms of the feminine allomorph of the pronoun 'one' were evidently also used in composition to form the oblique cases of pronominal stems such as PIE **tó-* 'this', **h₂ió-* 'which' and **k^wó-* 'which?', 'who?': **tó-smieh₂-* 'this one', **h₂ió-smieh₂-* 'which one' and **k^wó-smieh₂-* 'which one?'. Cf.

10	Early PIE	Late PIE	Skt	Av
gen.sg.	<i>*tó-smieh₂-es</i>	<i>*tó-sieh₂-es</i>	<i>tásyās</i>	YAv <i>-taɪhā</i>
	<i>*h₂ió-smieh₂-es</i>	<i>*h₂ió-sieh₂-es</i>	<i>yásyās</i>	YAv <i>yeɪhā</i>
	<i>*k^wó-smieh₂-es</i>	<i>*k^wó-sieh₂-es</i>	<i>kásyās</i>	OAv <i>kaɪhās-</i>
dat.sg.	<i>*tó-smieh₂-ei</i>	<i>*tó-sieh₂-ei</i>	<i>tásyai</i>	cf. OAv <i>axiiāi</i>
	<i>*h₂ió-smieh₂-ei</i>	<i>*h₂ió-sieh₂-ei</i>	<i>yásyai</i>	YAv <i>aɪhāi</i>
	<i>*k^wó-smieh₂-ei</i>	<i>*k^wó-sieh₂-ei</i>	<i>kásyai</i>	–

The assumed historical relation between the pronoun 'one' and the oblique case forms of the feminine pronouns is strongly suggested by the corresponding masculine and neutral inflections which evidently contain inflectional forms of PIE **sém-* ~ **sm-* m., n. 'one' and its derivative **sm-Hó-* 'someone' (Skt *sama-*, Goth *sums*, Gk *οὐδ-αμός* 'no-one'). The lat-

² A slightly different reconstruction of this item is proposed by Beekes (1982: 225–6). However, the differences do not to affect the present argument.

ter regularly lost its laryngeal in composition (by the so called *νεογνός*-rule). Cf. the following reconstructions (similarly already Beekes 1988: 78–9)

11	PIE
dat.sg.	<i>*tó-sm-ei</i> <i>*tó-smo-ei</i>
abl.sg.	<i>*tó-sm-es</i> <i>*tó-smo-ad</i>
instr.sg.	<i>*tó-sm-eh₁</i> –
loc.sg.	<i>*tó-sm-i</i> <i>*tó-smo-i³</i>

Concerning the syllabification of the oblique cases in the paradigm of the feminine 'one', note the parallelism between the two instances of *m*-loss before **i* and the developments subsumed under Stang's law:

12	loss of <i>*m</i> before <i>*i</i>
	1sg.pres.ind. gen.sg.f. 'one'
	Early PIE <i>*-omi</i> > Late PIE <i>*-ōi</i> ~ Early PIE <i>*smieh₂-es</i> > Late PIE <i>*sieh₂-es</i>
	<i>m</i> –vocalic, <i>i</i> +vocalic (expected values) <i>m</i> +vocalic, <i>i</i> –vocalic
	loss of <i>*u</i> before <i>*m</i>
	acc.sg. 'sky' 1pl.pres.ind. 'to hear'
	Early PIE <i>*dieu_m</i> > Late PIE <i>*diēm</i> ~ Early PIE <i>*k₁numé-s</i> > Late PIE <i>*k₁nmé-s</i>
	<i>u</i> –vocalic, <i>m</i> +vocalic (expected values) <i>u</i> +vocalic, <i>m</i> –vocalic

Unfortunately, it is impossible to decide if the loss of **m* in Early PIE **smieh₂-es*, **smieh₂-ei* is a further instance of the same hypothetical sound change which affected Early PIE **-omi*#. The instrumental plural of the *i*- and *u*-stems in **-i-mis*, **-u-mis*, which always retains the labial, makes it clear that the loss of **m* before **i* in Early PIE did not take place after any

³ The athematic case forms based on PIE **tó-sm-* are directly preserved in the locative in Indo-Iranian and Slavic (YAv *-ta-hmi*, *ya-hmi*, *ka-hmi*, Skt *tá-smin*, *yá-smin*, *ká-smin*, OCS *to-mi*, *je-mi*), as well as in the Germanic instrumental (Goth dat.sg. *þamma*, *-ē-h* and *þamma*, *-ē-h*). The thematic case forms based on PIE **tó-smo-* are well preserved, again, in Indo-Iranian and Balto-Slavic (cf. the dative YAv *-ta-hmāi*, *ya-hmāi*, *ka-hmāi*, Skt *tá-smai*, *yá-smai*, *ká-smai*, OCS *to-mu*, *je-mu*). For the latest period of PIE a mixed inflection with thematic and athematic case forms may perhaps be assumed based on the structural similarity between Indo-Iranian and Slavic. It is hardly accidental that in both branches an athematic locative is accompanied by a thematic dative.

preceding sound. The loss of **m* in the oblique cases of the feminine 'one', where the labial is preceded by a consonant, can also be attributed to a similar sound change known to be operative in the inflection of stems in PIE **-mon-*: cf. PIE **h₂ék-mon-* m. (Skt *ásmā* 'stone', YAv *asma* 'heaven').

	Early PIE	Late PIE	Skt	YAv
13 acc.sg.	<i>*h₂ék-mon-ŋ</i>	<i>*h₂ék-mon-ŋ</i>	<i>ásmānam</i>	–
gen.sg.	<i>*h₂k̑-mn-és</i>	> <i>*h₂k̑-n-és</i>	> <i>áśnas</i>	<i>aśnō</i>
instr.sg.	<i>*h₂k̑-mn-éh₁</i>	<i>*h₂k̑-n-éh₁</i>	<i>áśnā</i>	–

If one considers the development of Early PIE **smiéh₂-es*, **smiéh₂-e_i* to **s_iéh₂-es*, **s_iéh₂-e_i* and the development of Early PIE **h₂k̑-mn-és*, **h₂k̑-mn-éh₁* to **h₂k̑-n-és*, **h₂k̑-n-éh₁* together, one can assume that **m* in Early PIE was always lost between a consonant and a resonant such as **i* or **n*. In any case, this presumably ancient sound change is not compatible with the syllabification rules of Late PIE. The many deviations from these rules which must necessarily be assumed for the prehistory of Late PIE show clearly that Cowgill's syllabification of Early PIE **-omi#* as **-om_i#* is perfectly possible.

More to the point, there even seems to be a piece of direct evidence suggesting that we should expect **i* in **-omi#* to be consonantal rather than vocalic in Early PIE. In the locative singular of *i*-stems, the morpheme chain Early PIE **-éi-i* was obviously realized as **-é_ii* > Late PIE **-é_i* (cf. Skr *-ā*, Gk *-ŋ*).

This discussion has shown that the irregular syllabification in Cowgill's proposal is actually unproblematic once a wider chronological perspective is assumed. There are a several well-understood cases in which the reconstructed syllabification is in disagreement with the commonly assumed rules for Late PIE, which can be explained once different syllabification rules are assumed for an earlier stage of PIE.

3 The *m-b^h*-variation in the IE instrumental and dative-ablative plural

The second problem with Cowgill's account of the 1sg. primary ending of the thematic verbs is that we do not know exactly how the inflectional marker of the PIE instrumental plural is to be reconstructed. As is widely

known, this morpheme begins with a resonant **m* in one group of the IE daughter languages – cf. Lith *-mīs*, OCS *-mi*, PGmc **-miz* (Rhenish inscriptions *-ms*, Runic Norse *-mz*, Goth, OHG, ON *-m*) – but with an obstruent **b^h* in the other branches – PIr **-b^hiš* (Skt *-bhis*, OAv *-biš*, YAv *-biš*), Arm *-bk^ε*, PCelt **-bis* (OIr <-ib>, Gaul *-bi*, later *-be⁴*), probably also Myc Gk <-pi> if /-p^his/ was pronounced. As is also widely known, the same inconsistency is also found in the marker of the dative-ablative plural which has to be reconstructed as **-m(i)os* or **-b^h(i)os*. The distribution of the variants among the daughter languages is basically the same: cf. **m* in OLith *-mus*, OCS *-mŭ*, but clear reflexes of **b^h* in PIr **-b^hias* (Skt *-bhyas*, OAv *-biiō*, *-biias-cā*), PCelt **-bos* (Lepontic *-pos*, Celtiberian *-pos*, Gaul *-βo*, *-bo⁵*). Reflexes of a dative-ablative plural in **-b^h(i)os* are also found in Italic with Lat *-bus*, Osc *-fs*, in Venetic *-bos*, and in Messapic *-bas*. Finally, a very similar situation is to be assumed for the marker of the dative-ablative-instrumental dual, which is more difficult to reconstruct due to the early loss of the dual inflection of nouns in some branches of IE. This marker, again, begins with an **m* in Baltic and Slavic (Lith *-m*, OCS *-ma*) whereas **b^h* is found in Indo-Iranian (Skt *-bhyām*, OAv *-biiā*) and Celtic (OIr nasalising <-ib>). Now, how can we be sure that the marker of the instrumental plural originally began with **m*, as Cowgill proposed?

The most popular solution to this old problem of the strange **m~b^h*-variation in the three case forms operates with two originally different onsets of the inflectional markers in question: **b^h*- for the instrumental plural and **m*- for the dative-ablative plural. It is assumed that after the break up of PIE, the **b^h*- of the instrumental secondarily replaced the **m*- in the dative-ablative in, e.g., Indo-Iranian, Celtic or Italic, whereas in Baltic, Slavic and Germanic the **m*- of the dative-ablative replaced the **b^h*- in the instrumental. Cf. Beekes (1985: 143–4):

As the instrumental had **-bh(i)* it is clear that *m* belonged originally to the dative. This gives an easy explanation for the much discussed

- 4 In *anman-be*, *anmam-be* 'with names' from Châteaubateau, cf. Schrijver (1998). Why the Gaulic desinence does not end in *-s* is unclear.
- 5 The *-s* expected on the basis of Lepontic and Celtiberian is again missing for unclear reasons.

m- : *bh-* problem: they belonged to different endings and some languages generalized *m*, others *bh*.

Similarly Meier-Brügger (2000: 185):

Vielleicht ist ein Endungsset mit Abl.Dat.Pl. **-mos* und Instr.Pl. **-b^hi* als Ausgangspunkt anzunehmen. Von da aus hätte sich dann im Ital. und Indoiran. *-b^h-* als alleiniger Anfangskonsonant durchgesetzt und *-m-* verdrängt. Umgekehrt hätte sich im Baltoslav. und Germ. *-m-* durchgesetzt.

A more complex but essentially similar account is proposed by Matzinger (2001: 193–4), whose starting point are the oblique cases of demonstrative pronouns such as dat.sg. m. PIE **tósmōi*:

Es ist nun zu vermuten, daß ausgehend von den mit *m* anlautenden Kasus auch die zunächst wohl noch numerusindifferente Instrumentalform **toj-b^hi* mit ihrer dem Singular fremden Endung **-b^hi* nach dem Vorbild der mit *m* anlautenden Kasus analogisch zu **toj-mi* umgeformt wurde ... In weiterer Folge ist nun auf Grund paradigmatischen Drucks auch das Endungsmorphem des Dativ/Ablativ Plural analogisch zu **toj-m(i)os* umgeformt worden.

This traditional assumption strikes me as extremely implausible. Its seeming plausibility is only due to the fact that many of us are used to place the dative-ablative plural near the instrumental plural when we write down the inflectional paradigms of ancient IE languages on paper. This notational tradition generates the impression that the neighbours could easily exchange sounds in their inflectional markers. But PIE was a spoken language and nobody speaks in paradigms in which case markers stick together and can exchange parts of their phonological bodies. The proposed replacement of the first sound of the inflectional marker of one case form by the first sound of the inflectional marker of another case form would be a new kind of analogy not known from attested languages with a documented history. Such a development would neither be a case of proportional analogy nor a case of paradigmatic levelling. Proportional analogy needs a proportion which is impossible to construct here. Paradigmatic levelling is a means of reducing or eliminating allomorphy in the inflection of a lexical unit. No allomorphy would be reduced or eliminated by reshaping **-m(i)os* into **-b^h(i)os* in the dative-ablative plural of post-PIE

nouns and adjectives. The assumed transformation of **-m(i)os* into **-b^h(i)os* in the dative-ablative plural due to the influence of **-b^his* in the corresponding instrumental is in fact hardly less strange than would be, say, a reshaping of Skt *-su* to **-nu* in the locative plural because of *-nām* in the genitive.

In my opinion, the unexpected **m~b^h-*variation looks rather like an instance of secondary allomorphy within each case category with a subsequent generalisation of one of the two allomorphs in the daughter languages. An explanation of this kind has already been put forward by Jasanoff (2009: 144). According to his view, a pronominal dat.pl. PIE **sm-os* (reconstructed on the basis of the Anatolian and Tocharian enclitic personal pronouns: Hitt second and third person dat.pl. *-šmaš* and Tocharian 1–3pl. A *-m*, B *-me*) was reanalysed as **s-mos* in the dialects ancestral to Baltic, Slavic and Germanic. Then, the new allomorph of the inflectional marker **-mos* replaced the inherited ending **-b^h(i)os*. Similarly, the instr.pl. PIE **sm-is* (assumed by Jasanoff on theoretical grounds) was reanalysed as **s-mis*, thus giving birth to a similar allomorphy **-mis ~ *-b^his* and generalisation of the *m*-variant in the instrumental.

14 PIE

dat.pl. **sm-os* 'eis' (Hitt *-šmaš*, Toch B *-me*) **s-mos ~ *-b^h(i)os* → **-mos*
instr.pl. **sm-is* 'eis' (--) **s-mis ~ *-b^his* → **-mis*

However, it is very difficult to see why the hypothetical pronominal forms PIE **sm-os* and **sm-is* should be reanalysed as **s-mos* and **s-mis* in the prehistory of Baltic, Slavic and Germanic. Such a reanalysis is perhaps possible in an inflectional paradigm with a high degree of suppletivism like the paradigm found in Hittite:

	Hitt	
	(third person)	
	sg.	pl.
nom.c.	<i>-aš</i>	<i>-e</i>
acc.c.	<i>-an</i>	<i>-uš</i>
nom.-acc.n.	<i>-at</i>	<i>-e</i>
dat.	<i>-še</i>	<i>-šmaš</i>

It is essential for the assumed reanalyses that case forms of the hypothetical demonstrative pronoun **s-mos* and **s-mis* entered such a paradigm in

the prehistory of Baltic, Slavic and Germanic, too, but this does not seem to be supported by any known facts.

Moreover, it is not entirely clear why the hypothetical demonstrative pronoun reflected in the enclitic pronouns of Hittite and Tocharian should be reconstructed as dat.pl. PIE **sm-os* and instr.pl. **sm-is* with a root **sm-*. In my opinion, the situation in Hittite where the dative case of the third person enclitic personal pronoun displays a pattern sg. *-še* ~ pl. *-šmaš*⁶ points rather to a segmentation sg. *-š-e* ~ pl. *-š-maš*, with a desinential *-maš* indeed similar to the ending of the dative plural in Baltic and Slavic. This more traditional analysis makes it possible to identify the Anatolian enclitic personal pronoun of the third person in the dative with the well-known PIE reflexive pronoun which is often used as personal pronoun of the third person in the individual languages (cf. most recently Petit 1999):

16	PIE	
	acc.sg. m. <i>*se</i>	refl. Lat <i>sē</i> , Gk <i>ἐ</i>
	dat.sg. m. <i>*soi</i> >	refl. Gk <i>οί</i> , OCS <i>si</i> , Lith <i>-si</i> ; encl. pers. OAv <i>-hōi</i> , YAv <i>-hē</i> , <i>-šē</i>
	nom.sg. f. <i>*sih₂</i>	pers. OAv <i>hī</i> , PGmc <i>*sī</i> , obl. <i>*sjō-</i> (Goth <i>si</i> , OHG <i>sī</i> , acc. <i>sia</i>), PCelt <i>*sī</i> (OIr <i>sí</i> , MW MCo MBr <i>hi</i>)
	acc.sg. f. <i>*sih₂m</i>	encl. anaph. of all genders Skt <i>sim</i> , YAv <i>hīm</i> , PCelt <i>*sim</i> (Gaul dem. n. <i>-sin</i> in <i>so-sin</i> , OIr indecl. anaph. <i>sin</i>) ⁷

This traditional identification of the Anatolian pronouns given in (17) with the PIE reflexive pronoun leads to the reconstruction dat.sg. **s-oī* ~ dat.pl. **s-mos* with a clear remnant of the PIE dative-ablative plural ending

6 Cf. sg. Pal *-ši* ~ pl. CLuw *-mmaš*, HLuw *<-ma-za>*. Obviously due to its reflexive function the dat. pl. Hitt *-šmaš*, CLuw *-mmaš*, HLuw *<-ma-za>* is also used in the paradigm of the second person enclitic pronoun. This situation led to the replacement of the inherited dative singular of the third person by the corresponding form of the second person in the Luwian branch: the dative singular corresponding to CLuw *-mmaš*, HLuw *<-ma-za>* is CLuw *-du*, HLuw *<-du>* as in the second person. In Palaic the dat.sg. *-ši* is used also in the dative plural which seems to be secondary too.

7 See Schrijver (1997: 39–48) for the Celtic pronoun forms.

**-m(i)os* in two further branches of IE (cf. Čop 1974, Schmidt 1978: 153–4, Katz 1998: 242–7).⁸

17	dat.sg. Hitt <i>-še</i> , Pal <i>-ši</i> ~	dat.pl. Hitt <i>-šmaš</i> , CLuw <i>-mmaš</i> , HLuw <i><-ma-za></i> , Toch A <i>-m</i> , B <i>-me</i>
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To me, the most promising way to account for the allomorphy which is needed to explain the **m~b^h*-variation in question is, again, not to look for possible morphological restructurings but for a sound change possibly once operative in a particular inflectional class of PIE (cf. Untermann 1984: 152, Strunk 1984: 140–41).

Such an explanation seems to be the only way to account for the fact that we actually find traces of *b^h*-forms in the *m*-languages and traces of *m*-forms in the *b^h*-languages. One remnant of this kind is the discussed reflex of **-m(i)os* in the dative plural of the enclitic demonstrative pronouns in Anatolian which seems to have been a *b^h*-language according to the isolated adverbial forms Hitt *kuwāpi* ‘where’, ‘when’, *kuwāpi-kki* ‘somewhere’, ‘sometime’ < **k^wo-b^hi*, cf. the PIE interrogative pronoun **k^wó-* ‘who’, ‘what’ (Skt *kás*, Goth *has*, Lith *kàs*).⁹

A well-known trace of the *b^h*-endings in the *m*-languages is PIE **h₂ntb^hi* ‘on both sides’, ‘around’ which is reflected in Gk *ἀμφί*, *ἀμφί-*, Lat *amb-*, *am-*, PCelt **ambi-* (Gaul *ambi-*, OIr *imb-*) and PGmc **umbi-* (OE

8 Similarly, Dunkel (2003) who, however, pays no attention to the synchronic relation Hitt sg. *-še* ~ pl. *-šmaš*, and suggests *-šmaš* < **-su-mos* by syncope (see Katz 2007: 177 on this reconstruction). Rieken (2009: 43–4) explains Hitt dat.pl. *-šmaš* as an aphaeretic dat.pl. **o-sm-os*, which originally belonged to the inflection of the anaphoric pronoun PIE **o-* (cf. Skt m. gen.sg. *a-sya*, dat.sg. *a-smai* etc.). This analysis does not seem particularly attractive either, because the corresponding dat.sg. Hitt *-še* would then again reflect some different pronoun.

9 Hitt *kuwāpi* ‘where’, ‘when’ < **k^wo-b^hi* need not be as old as PIE. The traditional assumption that this adverb is also reflected in Lat *ubī* ‘where’, *ali-cubī* ‘somewhere’, *sī-cubī* ‘if anywhere’ (cf. for instance again Jasanoff 2009: 139, Melchert & Oettinger 2009: 63) is difficult to defend for phonological reasons. The loss of **k^w* in the simplex is only secured before an old **u*, cf. Lat *us-que* ‘up to’, ‘as far as’ which is obviously related to OIr *co*, MW *py* ‘to’, ‘till’ < **k^wút-s* but *quod* ‘what’, ‘how much’ < **k^wód* with retained velar. Lat *ubī* as well as Osc *puf*, Umb *pufe* ‘where’ should be rather connected with Skt *kúha*, OAv *kudā*, OCS *kŭde* ‘where’ (cf. de Vaan 2008: 295, 636).

ymbe-, OHG, OS *umbi-*, ON *um*).¹⁰ Jasanoff (1976, 2009: 139) has plausibly connected this adverb with the PIE noun **h₂ént-* ~ **h₂nt-* 'forehead', 'front' (Hitt *hant-*, locative singular in Skt *ánti*, Gk *ávτι*, Lat *ante* 'in front of', 'facing'). However, due to its semantics, PIE **h₂ntb^hi* 'on both sides', 'around' can hardly reflect an independent formation based on **h₂ént-* ~ **h₂nt-* 'forehead', 'front'. 'Sidewise' suggested by Jasanoff lacks the idea of 'both'. It seems more probable that the dative-ablative-instrumental dual **h₂nt-b^hóh₁* 'with two fronts' was secondarily reinterpreted as masculine nominative-accusative dual **h₂ntb^h-óh₁* 'both' (> Gk *ἄμφω*, Lat *ambō*, f. -ae), cf. the secondary neutral form **h₂ntb^h-óih₁* (> Toch B *antapi*, *āntpi*). PIE **h₂ntb^hi* is best understood as a secondary adverbial based on the compound form of **h₂ntb^hóh₁* m., **-óih₁* n. 'both'. The model for the creation of this special form **h₂ntb^hi-* was obviously provided by PIE **d(u)uóh₁* m., **-óih₁* n. 'two' (cf. Skt *duvā* m., -é f., n., OCS *dūva* m., n., -ě f.),¹¹ which in composition takes the form **duí-* (cf. Skt *dvi-pád-*, Gk *δί-πους*, Lat *bi-pēs* 'with two legs' etc.).¹²

10 The adverb OE *ymbe*, OHG, OS *umbi* 'about', 'around' with its retained short vowel in *auslaut* position can only be explained as being recently extracted from compounds.

11 See Cowgill (1985b) and Strunk (1992: 198–9) on the reconstruction of the variant form **duuo*.

12 Thus, PIE **h₂ntb^hi* is no sufficient reason to assume that PIE **-b^hi* originated not as a case ending of nouns, pronouns and adjectives, but rather as a suffix for deriving adverbs with a special semantics, as proposed by Kuryłowicz (1964: 200–201), Jasanoff (2009: 139) and Melchert & Oettinger (2009). It seems probable that **h₂ntb^hóh₁* m., **-óih₁* n. and **h₂ntb^hi-* were secondarily reanalysed as compounds in Late PIE or even later times. This is suggested by the analogically created **o-b^hóh₁* m., **-óih₁* n. in Balto-Slavic, cf. OCS *oba* m., *obě* f. 'both', Lith *abū* 'both', with a secondary pluralic inflection also OPr nom. *abbai*, acc. *abbans*, Latv nom. m. *abi*, f. *abas* 'both'. In Indo-Iranian, reflexes of **u-b^hóh₁* m., **-óih₁* n. are attested, cf. Skt *ubhá*, YAv *uua*, OP *ubā* m. and Skt *ubhé*, OAv *ubē* f. and n. 'both'. PIE **o-b^hóh₁*, **-óih₁* and **u-b^hóh₁*, **-óih₁* are most probably based on the anaphoric pronoun PIE **o-* (Skt m. gen.sg. *a-sya*, dat.sg. *a-smāi*) and its possible variant form **u-* (cf. similarly PIE **k^wó-* 'who', 'what' in Skt *kás*, *kád* but **k^wú-d^he* 'where' in Skt *kú-ha*, OAv *ku-dā*, OCS *kū-de*). The compositional nature of such formations in Late PIE times or later is indicated by reflexes of secondarily extracted **b^hóh₁*, **-óih₁* 'both' and **b^hi* 'around' in the IE languages of Europe. Both the adjective and the adverb are found in Germanic, cf. Goth nom.pl. *bai* m., *ba* n., acc.pl. *bans* m., 'both', OE

A clear remnant of the *m*-forms in the languages otherwise known to use *b^h*-endings is found in the inflection of the demonstrative and interrogative pronouns. Cf. the Slavic instrumental singular forms such as OCS *tě-mī* < **toi-mi* 'by that', *cě-mī* < **k^woi-mi* 'by whom'. The reflexes of **oi-* show clearly that such forms are back-formed to the corresponding instrumental plural OCS *tě-mi*, *cě-mi* where the diphthong is inherited, cf. PIIr **ai-b^hiš*, **tái-b^hiš* (Skt *ebhis*, *tébbhis*, YAv *aēibiš*), PGmc **pai-miz* (Goth

nom.pl. *bā* m., f., *bū* n. 'both' and Goth *bi* 'about', 'over', OE, OS, OHG *bi* 'near', 'by' (with secondary lengthening). The adverb **b^hi* 'around' must be also assumed for Celtic, cf. OW *bi-hit*, *be-het*, OBr *bi-chit*, *bi-cett* > MW *bed*, MBr *bet* 'as far as', 'up to', 'until', originally 'by length' with MW *hyd*, MBr *hed* 'length' as second member of the compound (Morris Jones 1913: 415). In Greek, the adjective and the adverb seem to be secondarily implemented into the system of personal pronouns, cf. (enlarged by *s*-mobile) nom.-acc. 2du. *σφώ* 'you two', dat. 3pl. encl. *σφι(ν)* 'by them', 'to them' (with secondary forms such as acc. 3pl. encl. *σφε*, created on the model of other pronouns such as dat. Aiol. 1pl. *ἄμμι*, 2pl. *ῥμμι* ~ acc. 1pl. *ἄμμε*, 2pl. *ῥμμε*), cf. Wackernagel (1887: 139–40), Willi (2004b). Whether Skt *abhi* 'toward' and the Church Slavic preposition sometimes written <obī> 'toward', 'against' belong here too, as suggested for instance by Jasanoff (2009: 139) and Melchert & Oettinger (2009), is difficult to decide. The Slavic preposition most probably did not end in a vowel. It is attested in the oldest texts as OCS *o*, *ob* which is to be interpreted as old **ob* with a regular loss of the word-final consonant before a word beginning with a consonant and at the end of a clause. This is confirmed by Ru *o*, *ob*, Sln *ò*, *òb*, Po *o*, *ob* etc. The second vowel in the variant-form <obū> found in more recent Old Russian texts is most probably purely orthographical (word-final *ū* and *ī* were lost in Old Russian by the 11th c. but preserved in writing). The disyllabic forms OCz *obe*, Ru *obo* found side by side with *o* and *ob* do not secure older **obū*, but rather seem to be late analogical creations on the basis of the monosyllabic *ob*. The model for this analogy is provided by such prepositions as Cz *pod*, *pode*, Ru *pod*, *podo* 'under' (cf. OCS *podū*) or Cz *nad*, *nade*, Ru *nad*, *nado* 'above' (cf. OCS *nadū*). Thus, one has to reconstruct PSI **o* (before consonants) and **ob* (before vowels) pointing to Pre-PSI **ob*, **ab* or **eb* (for PSI **o*-reflecting older **e*- cf. such cases as OCS *otū* 'from' < PIE **(h₁)éti* 'beyond' in Skt *áti*, Gk *ἐτι*, Lat *et*, Goth *ip*). Pre-PIIr **eb^hi* or **ab^hi* 'toward' reflected in Skt *abhi* and pre-PSI **éb* or **áb* 'toward' in OCS *o*, *ob* make the impression of two differently formed locatives of a root noun. If Lat *ob* 'towards', 'against' belongs here as well, the most probable reconstruction of this noun in the locative singular is something like **óbh₂-i* for Indo-Iranian and **óbh₂* for Slavic while the Latin form is consistent with both reconstructions.

paim, OE *pāem*). Case forms like OCS *tě-mĭ*, *cě-mĭ* are not directly attested in the East Baltic languages, but they are presupposed for Proto-Baltic by OPr *māim*, *maim* ‘with me’ which is a clear instrumental beside the frequent acc. *mien* and dat. *mennei* (cf. Trautmann 1909: 269–70, Endzelin 1944: 132–3, Stang 1966: 248–9). The instrumental PBalt **mēimi* (> OPr *māim*) was evidently created parallel to the accusative **mēn* (> OPr *mien*) on the model of demonstrative pronouns such as instr.sg. m. PBalt **taiimi* (cf. OCS *těmĭ*) ~ acc.sg. m. **tan* (> Lith *tā*, Latv *tūo*). Now, the pronominal instrumental singular masculine in **-oĭ-mi* is found in Latin, where the desinence of the dative plural has the shape *-bus*. Cf. the Latin demonstrative adverbs with ablatival function *ill-im*, *ist-im* ‘from there’ (< **eln-oĭ-mi*, **est-oĭ-mi* ‘(beginning) with that’) and the instrumentals of time such as *ōl-im* ‘once’ < **oln-oĭ-mi* (cf. similarly already Reichelt 1899 and also Dunkel 1997). Recently, pronominal case forms of this kind were also found in Anatolian (Goedegebuure 2007): cf. HLuw abl.-instr.sg. <zi-na>, <zi-i-na> = *zin* from *za-* ‘this’ (cf. Hitt *kā-*) and <a-pi-na>, <a-pi-i-na> = *apin* from *apa-* ‘that’ (cf. Hitt *apā-*). HLuw *zin* seems to reflect PANat **koĭ-n* < **koĭ-mi* (cf. OCS *si-mĭ*), though I cannot account for the early loss of **-i#* yet.¹³ Thus, traces of PIE **-mi* are found in the *b^h*-branches Italic and Anatolian.¹⁴

But what sound change can be responsible for the **m~b^h*-variation in the dative-ablative and instrumental plural? The most attractive possibility seems to be a development of Early PIE **-ŋ-m-* into Late PIE **-ŋ-b^h-* in the inflection of the *n*-stems. Such a sound change would generate the following situation in the inflection of the PIE athematic nouns:

13 Perhaps regular after a diphthong, Hitt 1sg.pres. *pai-mi* ‘I go’ etc. then being analogical on the basis of 2sg. *pai-ši*, 3sg. *pai-zzi*.

14 This clear correspondence between Slavic (OCS *těmĭ*, *cě-mĭ*), Italic (Lat *ill-im*, *ist-im*) and Anatolian (HLuw *z-in*, *ap-in*) seems to suggest an already PIE instrumental singular of thematic pronouns in **-oĭmi*. Because of its **-oĭ-*, this instrumental singular can only be explained as a secondary analogical formation based on the corresponding plural in **-oĭmi-s*. The model for this analogy was most probably provided by the inflection of nouns and adjectives: in the *i*-stems sg. **-imi* ~ pl. **-imi-s*, *u*-stems sg. **-umi* ~ pl. **-umi-s*, *o*-stems **-ōi* ~ pl. **-ōi-s* (cf. the more detailed discussion below).

18	<i>i</i> -stems	<i>u</i> -stems	<i>r</i> -stems
dat.-abl.pl.	*-i-m(i)os	*-u-m(i)os	*-r-m(i)os
instr.pl.	*-i-mis	*-u-mis	*-r-mis
but	<i>n</i> -stems		
dat.-abl.pl.	*-ŋ-m(i)os	>	*-ŋ-b ^h (i)os
instr.pl.	*-ŋ-mis	>	*-ŋ-b ^h is

In the daughter languages, the allomorphies **-m(i)os ~ *-b^h(i)os* in the dative-ablative plural and **-mis ~ *-b^his* in the instrumental plural could then be secondarily eliminated in the opposite directions. One can assume that in Baltic, Slavic and Germanic the *m*-variants were generalised, thus replacing the *b^h*-variants in the inflection of the *n*-stems as well, while in Indo-Iranian, Armenian, Greek, Celtic and Italic, the *b^h*-variants spread to all stem classes, leaving only some traces of the *m*-allomorphs outside the declension system.

Certainly this attractive explanation only works if the assumed sound change: Early PIE **-ŋ-m-* > Late PIE **-ŋ-b^h-*, can be confirmed by independent evidence from other domains of the language system. In my view such evidence is indeed provided by a quite small class of denominal derivatives with a suffix **-mó-*, which are known to have existed in PIE. The clearest instance of this not very prominent derivational pattern is the following:

- 19 PIE **dóru ~ *dru-* n. ‘tree’ → **dru-mó-* m., coll. **dru-méh₂-* ‘small tree’, ‘bush’

PIE **dóru ~ *dru-* n. ‘tree’ is reflected in PIIt nom.sg. **dāru* (Skt *dāru*, YAv *dāuru*), gen.sg. **dráuš* (Skt *drós*, YAv *draoš*), cf. compounds like Skt *dru-ghaná-* m. ‘wooden club’, *dru-padá-* m. ‘wooden jamb’; gr. *δόρυ* ‘tree’, ‘wood’, cf. compounds like *δρυ-τόμος* ‘woodcutter’. The reconstruction of PIE **dru-mó-* m., coll. **dru-méh₂-* ‘small tree’, ‘bush’ is based on Skt (Br) *drumá-* m. ‘tree’, Hom. Gk *δρυμά* pl. ‘thicket’, cf. PSlav **drūmŭ* m. ‘shrub’, ‘busch’, coll. **drūma* ‘shrubbery’ (Ru dial., BRu *drom* m. ‘thicket’, ‘shrubbery’, Bg *drāmá*, Mc *drma* ‘thick low forest’, ‘shrubbery’, with a secondary dissimilation *dr-* > *gr-* in some dialects OCS, ORu *grūmŭ* ‘bush’, SCr *grm*, *grm* ‘kind of oak’, ‘bush’, ‘shrub’, Sln *grm* ‘bush’, ‘shrub’, Bg dial. *grām* ‘bush’, ‘shrub’, Mc dial. *grm* ‘bush’, ‘shrub’).

It is difficult to find more clear instances of this derivational pattern. PIE also had a class of primary derivatives in **-mó-* (cf. most recently Hamp 1983), though one can only rarely confidently assume a denominational *-mó-* formation. However the following case looks promising:

20 PIE **uróHd-* ~ **urHd-* f. 'root' → **urHd-mó-* m. 'root' or 'branch'

PIE **uróHd-* ~ **urHd-* f. 'root' is clearly reflected in PGmc **wrōt-* f. 'root' (ON, OSw, ODa *rót*, nom.pl. ON *rōtr*, OSw *róter*, ODa *rótaer*), cf. the derivatives **urHd-i-* in PGmc **wurti-* f. 'root' (Goth *waurts*, ON *urt*, OE *wyrt*), **urHd-iHk-* f. 'root' in Lat *rādx*, *-īcis* 'root',¹⁵ **urHd-ió-* m. in PCelt **uradio-* m. 'root' (MW *gwreid* 'roots', 'origin', OCo (singulative) *grueit-en* 'root', Br (singulative) *gwriz-ienn*, pl. *gwrizioù* 'root', cf. Schrijver 1991: 182–3, 1995: 173–5). The reconstruction of PIE **urHd-mó-* m. 'root' or 'branch' is based on Lat *rāmus* 'branch', cf. PCelt **uradmo-* m. or n. 'root' which seems presupposed by PCelt **uredmā-* f. (OIr *frén*, *frém* 'root', obviously with dissimilation in the frequent dat.pl. *frémaib* > *frénaib*, W *greddf* 'root', 'disposition', 'nature'). PCelt **uradmo-* m. or n. 'root' ~ **uredmā-* f. 'part of the plant on which the roots grow' seems to be a secondary vřddhi-derivative following the pattern PCelt **karsno-* n. 'horn' with **ar* < **r* before **s* (Galatian *κάρνον* 'trumpet', MW, OBr *carn* 'hoof') ~ **kersnā-* f. 'part of the head on which the horns grow' (MW *cern* 'cheek-bone', 'side of the head', Br *kern* 'crown of the head', OIr *cern* 'angle', 'corner', in particular on a helmet).

With *n*-stems as derivational bases the suffix PIE **-mó-* seems to turn into **-b^hó-*, hence **-ŋ-mó-* > **-ŋ-b^hó-*. Cf. the following three cases:

21

- a PIE **(u)rs-én-* ~ **(u)rs-n-* m. 'bull' → **(u)rs-ŋ-mó-* > **(u)rs-ŋ-b^hó-* m. 'bull'
- b PIE **h₁él-on-* ~ **h₁l-n-* m. 'deer' → **h₁l-ŋ-mó-* > **h₁l-ŋ-b^hó-* m. 'deer'
- c PIE **h₃ér-on-* ~ **h₃r-n-* m. 'eagle' → **h₃r-ŋ-mó-* > **h₃r-ŋ-b^hó-* m. 'partridge'

The reconstructions are based on the following data:

- a PIE **(u)rs-én-* ~ **(u)rs-n-* m. 'bull' → **(u)rs-ŋ-b^hó-* m. 'bull'

PIE **(u)rs-én-* ~ **(u)rs-n-* m. 'bull' > PIr **(u)rs-án-* ~ **(u)rs-n-* m. (Skt acc.sg. *vřṣaṇam*, gen.sg. *vřṣaṇas* 'virile', 'male animal', esp. 'bull' or 'stallion', YAv *aršan-* m. 'man', 'male animal', OP PN nom.sg. <ariya-rša>), Gk

(Hom., Ion.) *ἄρσην*, att. *ἄρρην* 'virile', beside Herodot *ἔρσην*, Herodian *ἐρσῆν* 'virile', Lakon. *εἰρήν* 'virile', 'adult' (cf. Solmsen 1897, Peters 1993).

PIE **(u)rs-ŋ-b^hó-* m. 'bull' > PIr **(u)rs-a-b^há-* m. (Skt *vřṣa-bhá-*, *vřṣa-bhá-* m. 'bull', YAv PN *varāša-uua-*), cf. in Greek Ion. *Εἰραφιότης*, Aiol. *Ἐρραφεώτης* (epithet of Dionysos who is often compared with a bull), which is a clear derivative of **εἰραφος*, **ἔρραφος*, cf. also the name of a month, *Εἰραφιών*.

- b PIE **h₁él-on-* ~ **h₁l-n-* m. 'deer' → **h₁l-ŋ-b^hó-* 'deer' with a vřddhi-derivative **h₁él-ŋ-b^hó-* 'deer' (vřddhi-formations without an observable semantic deviation are frequently found with old animal names, cf. the most clear case of PIE **k₁uó-* m. in MW *carw*, MB *karo*, MCo *carow* 'deer', OPr (EV) *sirwis* 'roebuck' beside **k₁éruo-* m. in Lat *ceruus* 'deer').

PIE **h₁él-on-* ~ **h₁l-n-* m. 'deer' > OCS nom., acc.sg. *jeleni*, Ru *olén* m. 'deer', arm. *elēn* 'doe', enlarged to *io*-stem in East Baltic, Lith *ėlnis* 'deer', Latv *ālnis* 'elk'; the *n*-stem is also presupposed by post-PIE feminine derivatives such as PSlav **olni* 'doe' (OCS gen.pl. *alūnii*, OCz *laní*, OPo *laní*), MW *elein*, pl. *alanet* 'young deer', 'doe', 'hind-calf' (< PCelt nom.sg. **elanī*, nom.pl. **elanijās*, cf. Schrijver 1995: 78–9).¹⁶

PIE **h₁él-ŋ-b^hó-* 'deer' > Gk *ἐλαφος* m. 'deer', f. 'deer, doe', cf. PCelt **elambo-* in Gaul *elembiu-*, *elembi-*, the shortened notation of a month-name in the calendar of Coligny (the attestations are discussed by Thurneysen 1899: 535–6, Delamarre 2001: 135), cf. the Greek month-names *Ἐλάφιος* and *Ἐλαφη-βολιών*, based on *ἐλαφη-βολία* 'deer-hunting', as a typological parallel (cf. again Thurneysen 1899: 535–6 with ref., Szemerényi 1974: 279).

The derivational base of the vřddhi-derivative PIE **h₁l-ŋ-b^hó-* m. 'deer' is presupposed by the feminine derivative **h₁l-ŋ-b^hiH-* f. reflected in arm. *aloj* 'young she-goat', 'she-kid' (Olsen 1999: 66–7, 196) and by PGmc **lambaz-* n. 'sheep', 'lamb' (Goth, ON, OS *lamb*, OHG *lamb* with nom.pl. *lambir*, OE *lomb* with nom.pl. ws. *lombru*, angl. *lombur*) which seems to be

15 Borrowed into Gk as *ῥάδιξ*, *-ἱκος* 'branch', cf. Griepentrog (1995: 460).

16 Adams (1985: 273–6) reconstructs the root of PIE 'deer' with a second laryngeal after the **l*; this hypothesis generates problems with Hom. Gk *ἐλλός* 'hind-calf' which is traditionally plausibly explained as **el-n-ó-* < **h₁l-n-ó-*.

a morphologically enlarged borrowing from a language with PIE $*\eta > *an$, for instance PCelt $*lambo-$ < $*h_1l-\eta-b^hó-$.¹⁷

- c PIE $*h_3ér-on-$ ~ $*h_3r-n-$ m. 'eagle' → $*h_3r-\eta-b^hó-$ 'partridge' (apparently with occasional resyllabification to $*h_3r-n-b^hó-$), cf. $\nu\ddot{r}ddhi$ -derivative $*h_3ér-\eta-b^hó-$ 'partridge', 'grouse' (for the semantics cf. the Greek derivative of PIE 'eagle' ὄρνις, gen.sg. -ιδος m., f. 'bird', in more recent sources from Attica especially 'cock' or 'fowl').

PIE $*h_3ér-on-$ ~ $*h_3r-n-$ m. 'eagle' > Hitt $hāran-$ c. 'eagle' (nom.sg. < $ha-a-ra-aš$ >, gen.sg. < $ha-a-ra-na-aš$ >, acc.cg. < $ha-a-ra-na-an$ >), cf. CLuw acc.pl. < $ha-ra-ni-en-za$ > which designates some bird (cf. Kloekhorst 2008: 301–2); PGmc $*ar-an-$ m. 'eagle' (Goth nom.pl. *arans*, ON *are*, *orn*, OHG *aro*), cf. the suffixal derivative Gk ὄρνειον n. 'bird'.

PIE $*h_3r-\eta-b^hó-$ m. 'partridge' > PSlav $*rěbŭ$ m. 'partridge' (Sln *rěb* m. 'partridge', Ru dial. *rjab* m. 'sand-grouse', 'hazel-grouse', diminutive Ru dial. *rjab-ók*, *rjab-éc* 'hazel-grouse'; cf. the derived botanical term Ru *rjab-ína* 'rowan berries', 'rowan tree');¹⁸ resyllabified as $*h_3r-n-b^hó-$ > PSlav $*irmbo-$ reflected in the diminutive Bg dial. *érbi-ica* 'partridge' and in the botanical term Po ka. *jerzb-ina*, USb dial. *jerb-ina* 'rowan berries', 'rowan', Sln dial. *rb-íka* 'blackberry'; PBalt $*irmbē$ f. 'partridge' (Lith *irbė*, *ierbė*, Latv *irbe*).

PIE $*h_3ér-\eta-b^hó-$ > PSlav $*orěbŭ$ m. 'partridge' (ORu nom.sg. *erjabī*, nom.pl. *orjabī* f. or m., SCr *jāreb*, *jarēb* m., Sln *jarēb*, *jerēb* m., Po *jarzq̄b* m. 'partridge', cf. diminutive Ukr *orjáb-ok*, Ch *jeřáb-ek*, Po *jarzq̄b-ek* m. 'snipe', 'woodcock', cf. the botanical term Po *jerzq̄b-ina*, dial. *jarzq̄b-ina*, *orzq̄b-ina*,

17 Cf. the semantically quite similar borrowing of PCelt $*karu-$ m. 'deer' (MW *carw*, MBr *karo*, MKo *carow*) into Baltic and Slavic, where the word is presupposed by the secondary feminine formation meaning 'cow' Lith *kárvė*, PSi $*korva$ (OCS *krava*, Ru *koróva*, Po *krowa*). As in the case of 'lamb' in Germanic, the target-languages use the Celtic term for a wild animal to designate a domestic one.

18 Cf. for the semantics NHG *Vogelbeere* 'rowan berry', *Vogelbeerbaum* 'rowan tree'; morphologically the same pattern as in Ru *smoród-ina* 'currant', 'currant-bush', Ukr *smoród-yna* 'blackcurrant' to Ru dial. *smórod*, Ukr *smórid*, OCS *smradŭ* 'malodour'.

BRu *jarabína*, Ukr dial. *orjábyna* 'rowan berries', 'rowan tree'); PBalt $*aruñbē$ f. 'partridge' (Lith *arumbė*, *jārubmė*, *jerumbė*).¹⁹

The proposed sound law seems to open new perspectives for etymological research. This is illustrated with the following two tentative etymologies from Greek.

Gk ἀφελής 'even', 'smooth', also 'artless', 'simple' gives the impression of a compound with a privative ἀ-. The second part of this compound can be μέλος n. 'limb', then $*\eta-melēs-$ 'not having limbs' > $*\eta-b^helēs-$ > ἀφελής 'smooth'.

Gk ἄφενος n. 'riches', 'possessions', 'wealth' was originally perhaps a designation of inanimate possessions in contrast to humans and animals. In such a case it can be, again, a fossilized compound with ἀ- and μένος n. 'soul', 'spirit' (of humans and animals). This compound should be reconstructed as $*\eta-menēs-$ > $*\eta-b^henēs-$ 'not having soul'. With a secondary accent shift due to substantivisation it would yield $*\eta-b^henes-$ n. > ἄφενος 'possessions', 'riches'. This explanation seems to be morphologically and semantically superior to all other etymologies proposed so far (cf. most recently Willi 2004a with ref.; Willi's own explanation is 'rapid stream', 'torrent' secondarily narrowed to metaphoric 'affluence').

The proposed sound change gives the impression of a distant dissimilation for which direct contact between the sounds was not essential. This dissimilation obviously also occurred in the above-mentioned dat.-abl.-instr. du. PIE $*h_2ntb^hóh_1$ 'both' < $*h_2nt-móh_1$ 'with two fronts' of PIE $*h_2ént-$ ~ $*h_2nt-$ 'forehead', 'front' where the nasals were separated by a stop. This assumption is necessary due to the reflexes of $*b^h$ also found in the Germanic continuant of PIE $*h_2ntb^hi-$ 'around' > PGmc $*umbi-$ (OE *ymbe*, OHG OS *umb*). From this it follows that the desinences $*-b^his$ in the instrumental plural and $*-b^h(i)os$ in the dative-ablative plural emerged by regular sound change, not only in the inflection of the *n*-stems, but also in the paradigms of the active participles of the present- and aorist-stems in PIE $*-ónt-$ ~ $*-nt-$ and in the denominal derivatives in PIE $*-uént-$ ~

19 The Proto-Baltic and Proto-Slavic words for 'partridge' have been connected with PIE 'eagle' and the derivational pattern of Gk ἔλαφος 'deer' etc. by Vaillant (1974: 487); for a detailed description of the reflexes of these lexemes in all Slavic daughter languages, cf. Andersen (1996: 136–9, 2003: 62–4).

*-*uŋt-*'. So, for instance, in the case of the PIE root-present **h₁és-* ~ **h₁s-* → **h₁s-ónt-* ~ *-*ŋt-* 'being' (Skt *sánt-*, OLat *sōns*, OCS *sy*) and in the case of the root-noun **Hnās-* ~ **Hnas-* f. 'nose' → **Hnas-uént-* ~ **Hnas-uŋt-* 'having a nose':

22	Early PIE	Late PIE	Skt
acc.sg.	* <i>h₁s-ónt-ŋ</i>	* <i>h₁s-ónt-ŋ</i>	<i>sánt-am</i>
dat.sg.	* <i>h₁s-ŋt-éj</i>	> * <i>h₁s-ŋt-éj</i>	> <i>sat-é</i>
instr.pl.	* <i>h₁s-ŋt-mís</i>	* <i>h₁s-ŋt-b^hís</i>	<i>sad-bhís</i>
dat.pl.	* <i>h₁s-ŋt-m(i)ós</i>	* <i>h₁s-ŋt-b^h(i)ós</i>	<i>sad-bhyás</i>
acc.sg.	* <i>Hnas-uént-ŋ</i>	* <i>Hnas-uént-ŋ</i>	<i>nasvánt-am</i>
dat.sg.	* <i>Hnas-uŋt-éj</i>	> * <i>Hnas-uŋt-éj</i>	> <i>nasvat-é</i>
instr.pl.	* <i>Hnas-uŋt-mís</i>	* <i>Hnas-uŋt-b^hís</i>	<i>nasvad-bhís</i>
dat.pl.	* <i>Hnas-uŋt-m(i)ós</i>	* <i>Hnas-uŋt-b^h(i)ós</i>	<i>nasvad-bhyás</i>

Unfortunately, the assumed distant dissimilation **ŋ--m* > **ŋ--b^h* is clearly contradicted by the PIE accented 1pl personal pronoun, which is to be reconstructed as **ŋs-mé-* (cf. acc. Skt *asmān*, OAv *əhmā*, Gk Aioli. *ἄμμε*, Ion. *ἡμέας*). An analogical restitution of the original shape on the basis of the corresponding 2pl. pronoun PIE **ius-mé-* (acc. Skt *yuṣmā-*, Gk Aioli. *ὑμμε*, Ion. *ὑμέας*) cannot be excluded, but seems quite improbable.

The problem can be solved if one assumes that the morphophonological pattern **ŋ--m* > **ŋ--b^h* which originally arose in the instrumental, dative-ablative plural and dative-ablative-instrumental dual by contact dissimilation in the *n*-stems, secondarily spread to the other stem classes which contained an **ŋ* in the weak cases. Thus

23	PIE	* <i>h₂kmŋ-</i> 'stone' → dat.-abl.-instr.du. * <i>h₂kmŋ-móh₁</i> > * <i>h₂kmŋ-b^hóh₁</i>
		* <i>h₂ŋt-</i> 'front' → * <i>h₂ŋt-b^hóh₁</i>
		* <i>h₁sŋt-</i> 'being' → * <i>h₁sŋt-b^hóh₁</i>

The accented personal pronoun of the 1pl. PIE **ŋs-mé-* would not be affected by the process, because it is not a case form but a stem.

4 The PIE thematic instrumental under a closer inspection

Now we are in the position to inspect the formation of the instrumental in different IE languages more closely. As will be shown below, results of this investigation make the assumed sound change Early PIE **-omi* > Late PIE **-ō* even more plausible.

In Baltic and Slavic, the instrumental case forms of the vocalic stems are constructed in the following way:

24	instr.sg.			instr.pl.		
	Lith	Latv dial.	OCS	Lith	Latv dial.	OCS
<i>i</i> -stems	- <i>imi</i>	-	- <i>ĩmĩ</i>	- <i>imĩs</i>	- <i>im</i>	- <i>ĩmi</i>
<i>u</i> -stems	- <i>umi</i>	-	- <i>ũmĩ</i>	- <i>mĩs</i>	- <i>um</i>	- <i>ũmi</i>
<i>o</i> -stems	- <i>ũ</i> , - <i>úo</i>	- <i>u</i>	- <i>omĩ</i>	- <i>aĩs</i> , - <i>aĩs</i>	- <i>is</i>	- <i>y</i>

It is clear that the Baltic system is very close to that of Slavic; both systems seem to descend from a common ancestor. OCS *-omĩ* in the instrumental singular of the *o*-stems is most obviously a recent innovation on the model of the other stem classes; the corresponding ending *-y* in the plural shows that the *o*-stems originally did not follow the main pattern in Slavic as in Baltic. The vowel of the Lith desinences, sg. *-mĩ* ~ pl. *-mĩs*, is supposed to have been long originally, due to its reflexes in the North West Žemaitian dialects sg. *-mi* ~ pl. *-mis*, not sg. **-m* ~ pl. **-mēs* (cf. Stang 1966: 200–201). Although it is unclear how this length might have come into being, at least in the singular it is clearly secondary, as evidenced not only by the absence of a vowel in the only known instrumental form of OPr *māim* 'with me' < **-mi*, but also by the short vowel of OCS sg. *-mĩ*. If the length in Lith sg. *-mĩ* is secondary, the alleged length in the pl. *-mĩs* need not be original either. This latter length is, at first glance, supported by OCS pl. *-mi*, whose *i* presupposes a long vowel or diphthong, but *ĩ* in sg. ~ *i* in pl. is a common morphological pattern in Slavic: cf.

25	<i>i</i> -stems	nom. sg. - <i>ĩ</i> ~ pl. - <i>i</i>
		acc. sg. - <i>ĩ</i> ~ pl. - <i>i</i>
	<i>r</i> -stems	acc. sg. - <i>ĩ</i> ~ pl. - <i>i</i>
	<i>n</i> -stems	acc. sg. - <i>ĩ</i> ~ pl. - <i>i</i>
	<i>u</i> -stems	acc. sg. - <i>ũ</i> ~ pl. - <i>y</i>
	<i>o</i> -stems	acc. sg. - <i>ũ</i> ~ pl. - <i>y</i>

OCS sg. *-mĩ* ~ pl. *-mi* can easily have replaced more ancient sg. *-mĩ* ~ pl. **-mĩ* < sg. **-mi* ~ pl. **-mis*.

It can be shown that the instrumental singular of the *ā*-stems originally also ended in **-āmi*. The actual ending of this inflectional form is Lith *-à*, dial. *-ù*, in definite adjectives *-q̃-*, in Latv *-u*. All this points to PBalt **-ān* for which an older **-ām* suggests itself. Why this ending contains no **-i* is not entirely clear. It is, however, clear that PBalt **-ān* < **-ām* must originally have ended in a vowel which was later lost. This can be deduced from the general shortening of long vowels before **-m#* in the prehistory of Baltic and Slavic. Cf. the following clear instances of this shortening:

26

ā-stems pre-PBalt acc.sg. **-ām* > PBalt **-āñ* > Lith *-q̃-*, *-q̃-*, Latv *-u*, OPr *-an*
acc.pl. **-āns* > PBalt **-āns* > Lith *-às*, *-q̃s-*, Latv *-as*, OPr *-āns*

o-stems pre-PBalt gen.pl. **-ōm* > PBalt **-āñ* > OPr *-an*

PBalt **-ūñ* > Lith *-ų*, Latv *-u*, cf. OCS *-ŭ*

Thus, instr. sg. Lith *-à*, Latv *-u* ~ pl. Lith *-omis*, OLatv *-āms* reflect sg. **-āmi* ~ pl. **-āmis*. This reconstruction is a perfect match for OCS sg. *-oj-ρ* ~ pl. *-ami* whose unexpectedly heavy singular is borrowed from the inflection of demonstrative pronouns (cf. OCS instr.sg. f. *toj-ρ*). The assumed development can tentatively be reconstructed as follows:

27

			PBalt	Lith
<i>i</i> -stems	<i>*-i-mi</i>	<i>*-i-mi</i>	<i>*-imi</i>	<i>-imì</i>
<i>u</i> -stems	<i>*-u-mi</i>	<i>*-u-mi</i>	<i>*-umi</i>	<i>-umì</i>
<i>ā</i> -stems	<i>*-ā-mi</i>	<i>*-ā-m</i>	<i>*-ān</i>	<i>-à</i>

For the common prehistory of Baltic and Slavic the following system has to be reconstructed:

28

	sg.	pl.
<i>i</i> -stems	<i>*-i-mi</i>	<i>*-i-mi-s</i>
<i>u</i> -stems	<i>*-u-mi</i>	<i>*-u-mi-s</i>
<i>ā</i> -stems	<i>*-ā-mi</i>	<i>*-ā-mi-s</i>
<i>o</i> -stems	<i>*-ō</i>	<i>*-ōis</i>

This formation of the instrumental case to vocalic stems closely resembles the situation found in Armenian, cf.:

29	sg.	pl.	
	<i>r</i> -stems	<i>-r-b</i>	<i>-r-bk^c</i>
	<i>n</i> -stems	<i>-am-b</i>	<i>-am-bk^c</i>
	<i>i</i> -stems	<i>-i-w</i>	<i>-i-wk^c</i>
	<i>u</i> -stems	<i>-o-w</i> (< <i>*-u-w</i>)	<i>-o-wk^c</i> (< <i>*-u-wk^c</i>)
	<i>ā</i> -stems	<i>-a-w</i>	<i>-a-wk^c</i>
	<i>o</i> -stems	<i>-o-v</i>	<i>-o-vk^c</i>

Arm sg. *-b* ~ pl. *-bk^c* with their phonologically conditioned allomorphs are regular reflexes of more ancient sg. **-b^{hi}* ~ pl. **-b^{hi}-s*. The lost vowel *i* can still be observed in the instrumental singular of the indefinite pronoun *i-wi-k^c* 'by anything' where the vowel was protected by the indefinite particle *-k^c* (the corresponding nominative singular is preserved in č*-i-k^c* 'there is no'). The only difference between Balto-Slavic and Armenian consists in the fact that the instrumental of the *o*-stems in Armenian is constructed in the same way as in all other inflectional classes, thus presupposing Pre-Arm sg. **-o-b^{hi}* ~ pl. **-o-b^{hi}-s*. It goes without saying that this regularity has all earmarks of a recent innovation, the original situation being preserved in the less regular pattern of Baltic and Slavic.

A further IE daughter language with a similar means of forming the instrumental case seems to have been Greek. Mycenaean texts attest numerous pluralic instrumental case forms of athematic nouns and adjectives with the ending <-pi>. How exactly this <-pi> was pronounced is unclear; the easiest interpretation seems to be /-p^{his}/:

30

<a-ni-a-pi>	/hāniā-p ^{his} /	'with reigns', cf. Gk pl. ἡνία 'bridle', 'reins'
<e-ka-ma-pi>	/ek ^h ma-p ^{his} /	'with holdfasts', cf. Gk ἔχμα n. 'holdfast'
<po-pi>	/pop-p ^{his} /	'with legs', cf. Gk πούς m. 'leg'
<po-ni-ki-pi>	/phoinīk ^h -p ^{his} /	'with palms', cf. Gk φοῖνιξ f. 'date-palm'
<te-u-ke-pi>	/teuk ^h es-p ^{his} /	'with arms', cf. Gk τεῦχος n. 'toll', 'armour'

The instrumental plural in <-pi> is occasionally found also with thematic nouns, so for instance <o-mo-pi> /oimo-p^{his}/, cf. Gk οἶμος m. 'stripe'. However, forms in <-o>, probably for /-ois/ < **-ōis* (with Osthoff's shortening), are more usual in *o*-stems, cf. the adjectives <e-re-pa-te-jo> /elep^hantejois/ of Gk ἐλεφάντεος 'of elephants' and <re-wo-te-jo> /lewontejois/ of Gk λεόντειος 'of lions' for instance in PY Ta 722 <e-re-pa-te-jo ka-ra-a-pi re-wo-te-jo> 'with lionheads made of ivory' (cf. Risch 1985:

175–6). The dialects of more recent times, such as Homeric Greek, do not have an instrumental in their inflection. However, one finds numerous oblique case forms in $-\phi\iota(\nu)$ that are used with the same functions as the dative and, less frequently and less clearly, the genitive (cf. Lejeune 1957, Ilievski 1961, Nieto Hernández 1987). The grammatical number of forms in $-\phi\iota(\nu)$ is often difficult to establish, but in many cases one is obviously dealing with singulars.

31		
κεφαλή f. 'head'	~	κεφαλῇ-φι 'at the head', 'of the head'
παλάμη f. 'palm of the hand'	~	παλάμη-φι 'out of hand' or 'hands'
ὄρος n. 'hill', 'mountain'	~	ὄρεσ-φι 'on the hill', 'in the mountains'
ὄχος n. 'chariot'	~	ὄχεσ-φι 'by chariot' or 'chariots'
νηῦς 'ship'	~	ναῦ-φι 'by ship' or 'ships'

Some forms in $-\phi\iota(\nu)$ function as adverbs that hardly belong to the nominal inflection anymore. In such cases the semantics is sometimes clearly instrumental: cf. $\bar{\iota}$ -φι 'stoutly', 'mightily' of ἰς 'strength', 'power', i.e. 'by power', 'with power'; or $\theta\upsilon\rho\eta$ -φι 'outside' of $\theta\upsilon\rho\eta$ 'door', i.e. 'by the door'. Although Homeric $-\phi\iota(\nu)$ is not restricted to athematic nouns – cf. $\zeta\upsilon\gamma\acute{o}$ -φι of $\zeta\upsilon\gamma\acute{o}\nu$ 'yoke' and $\chi\alpha\lambda\kappa\acute{o}$ -φι of $\chi\alpha\lambda\kappa\acute{o}\varsigma$ 'copper' – it is, in my opinion, most probably the singular counterpart of Mycenaean $\langle -pi \rangle$, i.e. $/-p^{hi}/$. For the common prehistory of the Greek dialects one can reconstruct an instrumental case with inflectional markers sg. $*-p^{hi}$ ~ pl. $*-p^{hi}-s$ in athematic nouns and adjectives and pl. $*-o\dot{\iota}s$ ($\langle *-ō\dot{\iota}s \rangle$) in the inflection of the o -stems, cf. most recently Melchert & Oettinger (2009: 65–6).

This clear similarity between Balto-Slavic and Armenian – which seems to be supported by Greek – suggests that the PIE system of the instrumental case formation is to be reconstructed in the same way as for the common prehistory of Baltic and Slavic. This, however, is not usually done. The Indo-Iranian languages show a picture that differs considerably from that of Baltic, Slavic and Armenian:

32	PIIr		Skt		OAv	
	sg.	pl.	sg.	pl.	sg.	pl.
i -stems	$*-\bar{i}$	$*-i-b^{hi}\check{s}$	$-\bar{i}$	$-i-bhis$	$-\bar{i}$	$-i-bi\check{s}$
u -stems	$*-\bar{u}$	$*-u-b^{hi}\check{s}$	$-\bar{u}$	$-u-bhis$	$-\bar{u}$	$-u-bi\check{s}$
\bar{a} -stems	$*-\bar{a}$	$*-\bar{a}-b^{hi}\check{s}$	$-\bar{a}$	$-\bar{a}-bhis$	$-\bar{a}$	$-\bar{a}-bi\check{s}$
o -stems	$*-\bar{a}$	$*-\bar{a}\check{\iota}\check{s}$	$-\bar{a}$	$-ais$	$-\bar{a}$	$-\bar{a}i\check{s}$

If the above explanation of the $m\sim b^{hi}$ -variation among the IE daughter languages is correct, this presupposes the following traditional reconstruction of the instrumental case formation in PIE:

33	sg.	pl.
i -stems	$*-i-h_1$	$*-i-mi-s$
u -stems	$*-u-h_1$	$*-u-mi-s$
eh_2 -stems	$*-eh_2-h_1$	$*-eh_2-mi-s$
o -stems	$*-o-h_1$	$*-ō\check{\iota}s$

This reconstruction, based entirely on Indo-Iranian, differs from the reconstruction reached on the basis of Balto-Slavic, Armenian and, less directly, Greek evidence in only one respect: Indo-Iranian has no reflexes of $*-mi$ or $*-b^{hi}$ in the singular, but only lengthened stem vowels whose length is supposed to reflect the original instrumental ending $*-h_1$. The reflexes of $*-mi$, $*-b^{hi}$ in the instrumental singular of Balto-Slavic, Armenian and Greek are conceived as being of secondary origin. They are supposed to have arisen analogically on the basis of the corresponding pluralic inflections in $*-mi-s$, $*-b^{hi}-s$.

However, with this reconstruction of the original state of affairs, we are faced with one serious difficulty. We know that some case forms of the PIE athematic stems were sensitive to the type of inflection while others were not. This is valid, for instance, for the inflection of the i - and u -stems, where there was a clear difference between the proterokinetic and the amphikinetic inflection types in the genitive-ablative singular, but not in the dative-ablative plural.

34	i -stems					
	proterokinetic			amphikinetic		
	PIE	PIIr	Skt	PIE	PIIr	Skt
acc.sg.	$*-i-m$	$*-i-m$	$-i-m$	$*-oi-m$	$*-\bar{a}\check{\iota}-am$	$-\bar{a}y-am$
gen.-abl.sg.	$*-é\check{\iota}-s$	$*-\bar{a}\check{\iota}-\check{s}$	$-\acute{e}-s$	$*-\check{\iota}-és$	$*-\check{\iota}-ás$	$-y-ás$
dat.-abl.pl.	$*-i-m\check{\iota}ós$	$*-i-b^{hi}\check{\iota}ás$	$-i-bhyas$	$*-i-m\check{\iota}ós$	$*-i-b^{hi}\check{\iota}ás$	$-i-bhyas$

	u-stems					
	proterokinetic			amphikinetic		
	PIE	PIIr	Skt	PIE	PIIr	Skt
acc.sg.	*-u-m	*-u-m	-u-m	*-ou-ṃ	*-āuam	-
gen.-abl.sg.	*-éu-s	*-áu-š	-ó-s	*-u-és	*-u-ás	-v-ás
dat.-abl.pl.	*-u-miós	*-u-b ^h iás	-ú-bhyas	*-u-miós	*-u-b ^h iás	-ú-bhyas

Here, the strong accusative singular and the weak genitive-ablative singular are sensitive to the inflection type, while in the dative-ablative plural no difference between the types is observed. Now, the *h*₁-instrumental seems to belong to the weak cases that were sensitive to inflection type in PIE. This follows from the fact that this case behaves like the corresponding genitive-ablative in all known amphikinetic paradigms. Cf. beside the *i*- and *u*-stems the inflection of the amphikinetic nouns in PIE *-*mon*-, so for instance PIE **h*₂éġ-mon- m. in Skt *áśmā* 'stone', YAv *asma* 'heaven':

	Early PIE	Late PIE	Skt	YAv
acc.sg.	* <i>h</i> ₂ éġ-mon-ṃ	* <i>h</i> ₂ éġ-mon-ṃ	<i>áśmānam</i>	-
gen.sg.	* <i>h</i> ₂ ġ-mn-és	> * <i>h</i> ₂ ġ-n-és	> <i>áśnas</i>	<i>aśnō</i>
instr.sg.	* <i>h</i> ₂ ġ-mn-éh ₁	* <i>h</i> ₂ ġ-n-éh ₁	<i>áśnā</i>	-

In the inflectional paradigm of the *i*- and *u*-stems, the instrumental singular in *-*i*-*h*₁, *-*u*-*h*₁ with its double zero grade would deviate considerably from the theoretical expectations both in the proterokinetic and in the amphikinetic inflection:

		proterokinetic		amphikinetic	
strong	nom.sg.	*-i-s	*-u-s	*-ō(i)	*-ō(u)
cases	acc.sg.	*-i-m	*-u-m	*-oi-ṃ	*-ou-ṃ
weak	gen.sg.	*-éi-s	*-éu-s	*-i-és	*-u-és
cases	inst.sg.	*-éi-h ₁	*-éu-h ₁	*-i-éh ₁	*-u-éh ₁

Forms of the instrumental singular going back to the amphikinetic *-*i*-éh₁, *-*u*-éh₁ are indeed attested in Indo-Iranian: cf. Skt instr.sg. *sákhyā*, YAv *haša* of Skt *sákhā*, OAv *haxā* 'follower' (acc.sg. Skt *sákhāyam*, OAv *huš.haxāim*). But how are we to explain the instrumentals in PIIr *-*i*, *-*u*, which are supposed to reflect *-*i*-*h*₁, *-*u*-*h*₁?

The only answer I can give to this question is the following. PIIr instrumental forms in *-*i*, *-*u* do not reflect the more archaic type of instru-

mentals in *-*h*₁ at all. Rather, they are recent creations on the model of the thematic instrumental singular in PIIr *-*ā* = PBalt *-*ō*:

	o-stems	i-stems	u-stems
nom.sg.	*-a-s	*-i-s	*-u-s
acc.sg.	*-a-m	*-i-m	*-u-m
instr.sg.	*-ā	⇒ *-ī	*-ū

The older forms that were replaced by the innovative PIIr instrumentals in *-*i*, *-*u* can hardly be recovered now. Forms with reflexes of PIE *-*mi* like in Baltic, Slavic, Armenian and Greek seem to be an attractive solution.²⁰

The Indo-Iranian development might have been typologically similar to the evolution of the instrumental case formation in contemporary spoken Latvian. In Latvian the accusative and the instrumental singular merged in the *o*- and *ā*-stems for phonological reasons:

38	
<i>o</i> -stems Latv acc., instr. - <i>u</i>	cf. Lith acc. - <i>q</i> (< PBalt *- <i>añ</i>), instr. - <i>ù</i> (< PBalt *- <i>ō</i>)
<i>ā</i> -stems Latv acc., instr. - <i>u</i>	cf. Lith acc. - <i>q</i> (< PBalt *- <i>añ</i>), instr. - <i>à</i> (< PBalt *- <i>ān</i>)

This merger created a productive pattern that spread to the *i*- and *u*-stems as well, where the old accusative singular now came to be used also in the instrumental case, replacing the inherited forms ending in -*m* (= Lith -*mì*, OPr -*m*, OCS -*mī*). This led to a secondary system of instrumental case formation where *m*-endings were restricted to the plural in the same way as the *b^h*-endings in Indo-Iranian. Cf. the instrumental case in the most conservative Latvian dialects compared with the situation in PIIr:

²⁰ How the assumed coexistence of the *h*₁-instrumental and the *mi*-instrumental in PIE should be interpreted functionally, remains to be clarified. As the instrumental case of IE daughter languages can be used not only as proper instrumental ('to cut with a knife') but also as comitative ('to hunt with a dog'), it seems natural to associate the difference between the case in PIE *-*h*₁ and the case in PIE *-*mi* with these two functions. That the formal difference is not observed in the dual and the plural will not be unusual in PIE where the dative and the ablative are also distinguished in the singular only.

39	Latv dial.		PIIr	
	sg.	pl.	sg.	pl.
<i>i</i> -stems	- <i>i</i>	- <i>im</i>	*- <i>i</i>	*- <i>ib^{hi}š</i>
<i>u</i> -stems	- <i>u</i>	- <i>um</i>	~	*- <i>ub^{hi}š</i>
<i>ā</i> -stems	- <i>u</i>	- <i>ām</i>	*- <i>ā</i>	*- <i>āb^{hi}š</i>
<i>o</i> -stems	- <i>u</i>	- <i>is</i>	*- <i>ā</i>	*- <i>āi^š</i>

The similarity between the Latvian and the Indo-Iranian inflection patterns is so complete that one is immediately tempted to postulate a similar system for the common prehistory of the languages. We know, however, that the Latvian system with *m*-desinences restricted to the plural came into being due to a quite recent innovation. The same seems to be true for Indo-Iranian.

Thus, the following reconstruction – based on the Balto-Slavic, Armenian and partly Greek data and not directly contradicted by Indo-Iranian – seems to be the most realistic view on the formation of the instrumental case to vocalic stems in Late PIE:

40	sg.	pl.
<i>i</i> -stems	*- <i>i-mi</i>	*- <i>i-mi-s</i>
<i>u</i> -stems	*- <i>u-mi</i>	*- <i>u-mi-s</i>
<i>eh₂</i> -stems	*- <i>eh₂-mi</i>	*- <i>eh₂-mi-s</i>
<i>o</i> -stems	*- <i>ō</i>	*- <i>ōi^s</i>

It is evident that in such a system the instrumental singular of the *o*-stems, Late PIE *-*ō* for expected *-*o-mi*, is a perfect match for the 1sg. present indicative of the thematic presents, Late PIE *-*ō* for expected *-*o-mi*. Both forms in *-*ō* should, in agreement with Cowgill, be reconstructed as *-*ōi* < Early PIE *-*omi*. The intermediate stage *-*ōi* is proven for the instrumental by the corresponding pluralic form in Late PIE *-*ōi^s*, which may have emerged by the same sound law from Early PIE *-*omi-s* or reflect a secondary analogical creation on the model of the other stem classes. It is also possible that all forms of the instrumental plural are recent pluralisations of the singular forms on the model of the accusative: cf. in the inflection of PIE consonant stems acc.sg. *-*ṃ* (Skt -*am*, Gk -*α*) ~ acc.pl. *-*ṃ-s* (Skt -*as*, Gk -*ας*). In such a case, the pluralisation of the *o*-stem instrumental would have been accomplished on the stage *-*ōi*, more recent than Early PIE *-*omi*, but before **i* was regularly lost.

5 More instances of the proposed sound change in the inflectional morphology of PIE

The proposed sound change, Early PIE *-*omi* > Late PIE *-*ōi*, may help us to understand other mysterious aspects of PIE morphophonemics. One instance of this kind may be the often assumed variation *-*m* ~ *-*H* in some IE verbal roots:

- 41 PIE **trem* 'to tremble' ~ PIE **treH* 'to protect, rescue'
(with special semantics pointing to the same situation),
PIE **drem* 'to sleep' ~ PIE **dreH* 'to sleep'

PIE **trem* 'to tremble' is reflected in Gk *τρέμω*, Lat *tremō*. PIE **treH* 'to protect, rescue' seems to be reflected in the PIIr present **trā-ja-* (Skt *trā-ya-se*, YAv *θrā-īe-nte*) and root-aorist **trā-* (Skt *trā-sva*, OAv *θrā-zdūm*). Note that the IIr verb is used only in the middle voice. The original situation may be reconstructed in the following way. PIE **trem* 'to protect, rescue' builds a root-aorist **trém-* ~ **tṛm-* 'to protect, rescue', whose subjunctive **trém-e/o-* 'to be about to protect, rescue (oneself)' is reflected in Gk *τρέμω*, Lat *tremō*. The root-aorist PIE **trém-* ~ **tṛm-* 'to protect, rescue' builds a passive aorist with a 3sg. **tróm-i* > **trōi* 'got protected, rescued' > PIIr **trāi*, in which the *-*i* was retained due to monosyllabicity. This PIIr **trāi*, still clearly analysable as the 3sg. of a passive aorist, would have given birth to different secondary paradigmatic forms based on the new root **trā-*, such as 2sg. imperative middle **trā-sya* 'protect!' or a secondary present stem **trā-ja-* 'to protect, rescue'.

PIE **drem* 'to sleep' is reflected in Lat *dormiō*, inf. -*īre* 'to sleep' and OCS *drěmati*, 1sg. pres *drěml'jō* 'to slumber, doze' (a secondary intensive formation with lengthened root vocalism, type OCS *lēgati*, 1sg. pres *lēžō* of PIE **leg^h* 'to lie'). A hypothetical PIE root **dreH* 'to sleep' seems to be reflected in the PIIr root-formation **drā-* 'to sleep' (Skt part. med. *an-ava-drāṇā-* 'not falling asleep' AV, *vi-drāṇa-* 'awake' KS, opt. act. *ni-drā-yā-t*, fut. *drā-syā-ti* Br); cf. the nominal compound *ni-drā-* f. 'sleepiness' (RV). Here, too, it seems possible that the root formed a passive aorist 3sg. **dróm-i* > **drōi* 'was made to fall asleep' > PIIr **drāi*, on whose basis a new root **drā* 'to fall asleep' was created.

If this explanation of PIr **trā-* 'to rescue' and **drā-* 'to fall asleep' is correct the strange variation **-m ~ *-H* in the *auslaut* of these PIE roots needs not be assumed any more.

6 Conclusions

The desinence of the 1sg. present indicative of the thematic presents is to be reconstructed in agreement with Warren Cowgill as Late PIE **-ō < *-ōi < Early PIE *-o-mi*. The assumed sound change does not violate any known rules of syllabification of Early PIE, and finds a clear parallel in the instrumental singular of the thematic nouns: Late PIE **-ō < *-ōi < Early PIE *-o-mi*. The intermediate stage **-ōi* is clearly documented by the corresponding pluralic form Late PIE **-ōi-s*.

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